CLAIMS

1. A system (20) for adaptation/optimization of the speed of a rotating electric machine (22) included in the system (20), which machine (22) is intended to be directly connected to a distribution or transmission network (24) and comprising at least two electric windings, characterized in that the winding each comprises at least one electric conductor, a first semiconducting layer (14) arranged surrounding the conductor, an insulating layer (16) arranged surrounding the first semiconducting layer (14), and a second semiconducting layer (18) arranged surrounding the insulating layer (16), and that the system (20) comprises mechanisms(26) which generate the resultant stator and air gap flux of the machine (22) during operation, which flux is composed of at least two vectorial quantities.

2. A system (20) according to claim 1, characterized in that the potential of the first semiconducting layer (14) is essentially equal to the potential of the conductor.

3. A system (20) according to claim 1 or 2, characterized in that the second semiconducting layer (18) is adapted to form essentially one equipotential surface, surrounding the conductor.

4. A system (20) according to claim 3, characterized in that the second semiconducting layer (18) is connected to a predetermined potential.

5. A system (20) according to claim 4, characterized in that said predetermined potential is ground potential.

6. A system (20) according to any of the preceding claims, characterized in that at least two adjacent layers of the windings of the machine have essentially identical coefficients of thermal expansion.

7. A system (20) according to any of the preceding claims, characterized in that the conductor comprises a number of strands (12), at least some of which are in electric contact with one another.

8. A system (20) according to any of the preceding claims, characterized in that each of said three layers is secured to adjacent layers along essentially the whole contact surface.

9. A system (20) for adaptation/optimization of the speed of a rotating electric machine (22) included in the system (20), which machine is intended to be directly connected to a distribution or transmission network (24) and comprising at least two electric windings, characterized in that the windings are each formed from a high-voltage cable (10) comprising one or more current-carrying conductors, whereby each conductor exhibits a number of strands (12), a first semiconducting layer (14) arranged around each conductor, an insulating layer (16) of solid insulating material arranged around said first semiconducting layer (14), and a second semiconducting layer (18) arranged around the insulating layer (16), and that the system (20) comprises means (26) which generate the resultant stator and air gap flux of the machine (22) in operation, which flux is composed of at least two vectorial quantities.

10. A system (20) according to any of the preceding claims, characterized in that the insulating conductor or high-voltage cable (10) is flexible.

11. A system (20) according to claim 10, characterized in that the layers are arranged to adhere to one another also when the insulated conductor or high-voltage cable (10) is bent.

12. A system (20) according to any of the preceding claims, characterized in that the flux-generating member (26) comprises an extra winding (56), arranged on the stator (52) of the machine (22), and magnetization equipment (28) connected to the machine (22), whereby one flux vector is generated via the extra winding (56) and the magnetization equipment (28) and one flux vector is generated via the ordinary winding (54) of the machine (22).

13. A system (20) according to claim 12, characterized in that the magnetization equipment (28) is in the form of a first frequency converter (28).

14. A system (20) according to claim 13, characterized in that the system (20), in addition, comprises an auxiliary feeder (30) connected to the first frequency converter (28) and the machine (22).

15. A system (20) according to claim 14, characterized in that the machine (22) comprises an asynchronous rotor (60) and that the auxiliary feeder (30) comprises a stator winding (58) and a permanent-magnet rotor (62) connected to the asynchronous rotor (60).

16. A system (20) according to any of claim 14 or 15, characterized in that the system (20), in addition, comprises a transformer (32) connected to the first frequency converter (28) and the auxiliary feeder (30), said transformer being connected to a distribution busbar (36) via a first circuit breaker (34), and a second frequency converter (38) which is connected to the transformer (32) and which is connected to the distribution busbar (36) via a second circuit breaker (40).

17. A system (20) according to claim 1, characterized in that the windings are flexible and in that said layers make contact with one another.

18. A system (20) according to claim 17, characterized in that said layers are of a material with such elasticity and such a relation between the coefficients of thermal expansion of the materials that the volume changes of the layers, caused by temperature variations during operation, are capable of being absorbed by the elasticity of the materials such that the layers retain their contact with one another at the temperature variations which occur during operation.

19. A system (20) according to claim 18, characterized in that the materials in said layers have a high elasticity.

20. A system (20) according to claim 18, characterized in that each semiconducting layer constitutes essentially an equipotential surface.

21. A method for speed control of a rotating electric machine (22), which machine (22) is intended to be directly connected to a distribution or transmission network (24) and comprising at least two electric windings, each winding comprising at least one electric conductor, a first semiconducting layer (14) arranged surrounding the conductor, an insulating layer (16) arranged surrounding the first semiconducting layer (14), and a second semiconducting layer (18) arranged surrounding the insulating layer (16), which method comprises the following step:

- generating at least two vectorial quantities which constitute the resultant stator and air gap flux of the machine (22) during operation.

22. A method for speed control of a rotating electric machine (22), which machine (22) is intended to be directly connected to a distribution or transmission network (24) and comprising at least two electric windings, each winding being formed of a high-voltage cable (10) comprising one or more current-carrying conductors, whereby each conductor exhibits a number of strands, a first semiconducting layer (14) arranged around each conductor, an insulating layer (16) of solid insulating material arranged around said first semiconducting layer (14), and a second semiconducting layer (18) arranged around the insulating layer (16), which method comprises the following step:

- generating at least two vectorial quantities which constitute the resultant stator and air gap flux of the machine (22) during operation.

23. A method according to any of claim 21 or 22, which method is characterized by the following additional step:

- controlling at least one of the vectorial fluxes with respect to phase position as well as amplitude and speed of rotation relative to the flux generated and rotated by the connecting network (24).

24. A method according to claim 23, characterized by the following steps:

- generating a flux vector via an extra winding (56), mounted on the machine (22), and magnetization equipment (28) connected to the machine (22), and
- generating a flux vector via the ordinary winding (54) of the machine (22).

25. A method according to any of claim 23 or 24, characterized in that the rotating electric machine (22), in addition, comprises an asynchronous rotor (60), whereby the flux control is used for speed control of the machine (22) in generator operating mode.

26. A method according to any of claim 23 or 24, characterized in that the rotating electric machine (22), in addition, comprises an asynchronous rotor (60), whereby the flux control is used for speed control of the machine (22) in motor operating mode.

27. A method according to any of claim 23 or 24, characterized in that the flux control is used for damping the harmonic content of ~~the~~ stator voltage in the ordinary winding (54) of the machine (22).

28. A method according to claim 24, characterized in that the reactive magnetization current of the machine (22) is injected via the extra winding (56), whereby it is possible to control the voltage of the machine (22) on the ordinary winding (54) of the machine (22) for both a non-mains-connected and a mains-connected machine (22).

29. A method according to claim 25, characterized in that the rotating electric machine (22), in addition, comprises a permanent-magnet rotor (62), connected to the asynchronous rotor (60), for generating magnetization current and other auxiliary power.

30. A method according to any of claim 23 or 24, characterized in that the flux control is used for interruption-free change from generator operating mode to motor operating mode and vice versa.

31. A method according to any of claims 24-30, characterized in that the resultant flux in the machine (22) is

$$\Phi = \Phi_1 + \Phi_2$$ (Komplettera med vektorstreck !)

where Φ_1 is the rotating flux on the stator side of the machine and Φ_2 is the flux generated by the rotor current, whereby

$$\Phi_1 = \Phi_{1magn} + \Phi_{1stator}$$ (Komplettera med vektorstreck !)

where $\Phi_{1stator}$ is the rotating flux generated by the current in the ordinary winding

(54), whereby the speed of rotation on $\Phi_{1stator}$ is dependent on the frequency of the network and the number of pole pairs in the machine (22), and Φ_{1magn} is the rotating flux generated by the current in the extra winding (56), which flux is controllable with respect to phase position as well as amplitude and frequency relative to the flux vector of the ordinary winding (54).

32. A method according to claim 24, ~~characterized in~~ that the vectorially created flux in the machine (22) is controlled with the aid of the relative phase position as well as the relative amplitude value between the active and reactive current values of the ordinary winding (54) and the extra winding (56).

add a'